**GROSVENOR MINE INQUIRY SUBMISSION Key Issue 4**

**What the evidence establishes about the nature and cause of the serious accident at Grosvenor mine on 6 May 2020, including:**

**The relative likelihood of a strata collapse or a methane explosion in the goaf being the mechanism by which an explosive concentration of methane was expelled on to the longwall face.**

**The relative likelihood of the ignition source being frictional ignition, electrical fault, static electricity or PUR induced heating/spontaneous combustion.**

**GOAF FALL LIKELIHOOD**

**The evidence in the Statements of the injured workers and witnesses, or the “GROSVENOR MINE LFI-investigation-report-for-serious-accident-06052020.pdf” does not support that a major sudden failure of strata in the tailgate was the reason for the first overpressure event.**

**There is not one bit of Evidence presented that such an event or condition ever existed.**

**I have come to this after studying the following**

1. **RECORD OF INTERVIEW ADAM MAGGS ERZC GROSVENOR LW 104 (page 4)**
2. **WAYNE SELLARS TRANSCRIPT (page 5)**
3. **ANGLO GROSVENOR MINE LFI METHANE EXPLOSION 6th MAY (page 6)**
4. **EXTRACTS FROM INJURED COAL MINE WORKERS RECORD OF INTERVIEW (page 7)**
5. **MY EXPERIENCE GOONYELLA MIDDLE SEAM MINE ROOF FALLS (page 16)**

**MASSIVE ROOF FALL SCENARIO GENESIS**

**Mr Hunter QC (Counsel Assisting), was I believe the first person who raised the possibility in his opening Statements on the 9th of March 2021.**

**TRA.500.014.0005**

***“Accordingly, a spontaneous combustion event may well be responsible for the ignition, and the presence of methane on the face may be explicable by its ubiquity in the tailgate at this particular mine, a substantial fall of strata into the goaf that caused a windblast or perhaps even an* ignition *deeper in the goaf”* TRA.500.014.0005**

***A windblast could be the result of a goaf fall or it could be the result of a pressure wave associated with a methane ignition.*** **TRA.500.014.0010**

**The only persons to mention the almost certain assertion of a massive sudden roof fall being the mechanism, are Counsel Assisting.**

**That was then posed as questions/propositions that were put to Mines Department (RSHQ) Expert Witnesses to consider for the under Cross Examination.**

**I note that the Mines Department Expert Witnesses were not asked to consider a massive sudden roof fall in their formal reports.**

**It was only put to them for the first time while on the stand, as an almost certain accepted “FACT”.**

**ANDREW SELF**

***Q. So if in this case what has occurred is that a goaf fall has pushed an explosible mixture across a spontaneous combustion event, perhaps a small one, is it of concern that there were no obvious signs of spontaneous combustion occurring?*** ***TRA.500.021.0043***

***A. I think I say this down the bottom. Major concern, yes. Sorry, let me explain, if you will.***

***Q. Please.***

***A. There are two possible mechanisms. If we had a spontaneous combustion event taking place at less than the ignition temperature of methane, that is one circumstance. In that situation, the ventilation change caused by the goaf fall could push oxygen towards that event. I actually doubt that. I think it already had enough - if it was there, it had access to oxygen. In that event, then there could be a change in temperature caused by increased oxidation. I think probably not. I think the most likely event is that the event was above ignition temperature and the effect of the goaf fall was to push an explosible mixture towards it. So it would be an equilibrium in that the explosible mixture was not at the spontaneous combustion site.***

***Q. You say the absence of any detection by the traditional indicators beforehand is of major concern. Can you elaborate on that, as to why it's a concern?***

***A. We monitor for spontaneous combustion. We design systems to minimise the risk of spontaneous combustion. We gas monitor. We analyse data. Based on that data, we take actions such as inertisation. If we don't know that a spontaneous combustion event is beginning and even progressing, then we're unable to take action, and one of those actions may be to evacuate people. If we don't know it's there, then we can't take those appropriate actions, whatever they may be.***

***Q. So if I put a scenario to you, I'm going to ask you whether what we see there is consistent or inconsistent with it: there is a goaf fall, as described by Mr Thomas, which has pushed an explosible mixture in the vicinity of an ignition source, and there has then been an explosion, a methane explosion. Is that sequence of events explained or depicted by what we see in these traces?***

***TRA.500.021.0055***

***A. I believe so.***

***Q. If the goaf fall explains the presence of the methane, the second question is the ignition source?***

***A. The goaf fall doesn't explain the explosible mixture. That would already be there in the goaf. The goaf --***

***Q. Sorry - I'll let you explain.***

***A. The goaf fall would move mixtures around. The secondary effect of this is because we've had low pressure in the goaf, which we're saying is caused by the goaf fall - in other words, the material has fallen and created a low pressure zone above it - then that would then, that recovery part, if you look at the upward bump in the middle of all that, at 14:57:40, then that is a recovery, which means that air has gone back into the goaf. So it's indirect, but I think the goaf fall had two effects, and this is my hypothesis. It had two effects, one being that air was moved back into the goaf, creating a larger than normal explosible mixture in the goaf. And the second is it moved that goaf mixture around until it found the ignition source.***

***Q. Obviously at least there is evidence that suggests that there was a fall in the goaf on 6 May.***

***A. Yes.***

***Q. As far as you're concerned, is there any connection between the earlier HPIs and the events of 6 May?***

***A. Two comments to make. The fact that we're getting HPIs means that the gas make is not being managed as it should, so it's hard to disassociate an outpouring of gas - it's not an outburst. It's probably - you could term it an inrush of gas from the goaf into the ventilation on the longwall face. It's hard to 100 per cent separate those two issues.***

***But I have to say the mechanism I've seen with the HPIs generally involves something completely different from the goaf fall. So it's things such as excessive production for a period of time or barometric pressure changes or failure of goaf wells, things such as that. I think the event on 6 May in the afternoon was a completely different event from the HPIs in terms of mechanism.***

**BASIL BEAMISH**

***If there was an injection of air back into the goaf, if that coal had fallen down and it hadn't quite reached that point, but there was an injection of air from a windblast suck-back effect, then it could also create the same thing. It's like a bellows effect in a blacksmith's furnace.*** **TRA.500.022.0033**

***Q. Now, you spoke about windblast and suck-back. Can we have a look at slide 21. What are we looking at here?***

***A. This is a record out of an ACARP project that was done in 2001. It is a record of air movement from a windblast event. What you see initially is that with the windblast, the air velocity comes out from the goaf into the workings at a very rapid rate, in the order of about 3 seconds as shown on the graph there. But then within a space of another second, you get what's known as a suck-back effect, where the pressure differential created by the cavity and so on, creating a vacuum effect, sucks the air back into the goaf environment.*** ***TRA.500.022.0034***

None of the eyewitnesses or burnt Coal Mine Workers mention any concerns with the roof beyond dealing with the void in the Tailgate (#144 to 149).

There is no indication of high abutment pressure or cyclic loading in either the Records of Interview, Testimony of Wayne Sellars (1 of 5 Burnt Mine Workers) or the Anglo LFI.

If there was a competent, very, large area of unfallen goaf, there would higher abutment pressure on the chain pillars the face and the immediate Tailgate and Tailgate Roadway.

There was little floor heave.

1. **ADAM MAGGS ERZC GROSVENOR LW 104**

***MR MAGGS: We haven’t had much floor heave. We’ve had bugger all floor heave. We’ve had a little bit around that maingate***

By the evidence of Adam Maggs ERZC the maingate and tailgate “roadways” inbye the longwall in the goaf were standing nearly the Width of the roadway and it was standing much more than previous longwall blocks.

There was no weight on the installed secondary support “Cans”. In fact the workers had tried removing CANS to encourage the roof to fall as in previous blocks, without success

***MR STOOK: What did you see when you pulled back the maingate bag?***

***MR MAGGS: Yes, so that maingate roadway has been, yes, well in line with 36 cut-through then. 36 cut-through was still standing. And, you know, I’ll be honest with you right now, our maingate roadway and tailgate roadway had been standing. They’ve stood. You could see as far as you could see with that maingate roadway.***

***MR STOOK: Yes.***

***MR MAGGS: The cairns didn’t even have weight on them, really. They had a little bit around that 36 cut-through.***

***The goaf was tight up behind one – not fully tight, but you could see it was goafed up behind the shields. It was just that roadway. (Phone rang). Sorry about that.***

***MR STOOK: That’s been one of our, I guess, ambiguous things that we’ve seen in all the information so far. Just for clarification, when you say the roadway was standing, that’s basically just around the cairns, but everything else is in, or was it open for the width of the roadway?***

***MR MAGGS: The width of the roadway as far as you could***

***MR STOOK: As far as you could see?***

***MR MAGGS: Yes. And, you know, that was pretty – that’s pretty standard with this block.***

***MR STOOK: Yes, yes.***

***MR MAGGS: And same with the tailgate.***

***MR STOOK: Is it standard for other blocks***

***TRA.510.003.0016***

***MR MAGGS: Yes and – yes and no. The maingate, you know, it would come in halfway to your rib line, to your block – to your pillar side rib line in the maingate. But tailgate, no, not necessarily. Like, you know, it would follow us. You know, if we’d cut cairns out and different things like that, it would come right up to the back of our 149 and that. And, you know, it didn’t this time. A lot of the time, the boys were, you know, sometimes taking cairns and that out, and it’d hold up.***

***MR STOOK: In your statement, it talks about the goaf was right up to 149; right?***

***MR MAGGS: Yes.***

***MR STOOK: That would just be the outbye side of the goaf, not the actual roadway itself?***

***MR MAGGS: Not the roadway, so the goaf, the goaf. So when we’re talking about that, when I said it’s tight up against the back side, the goaf was tight to behind the So both roadways, you know, standing.***

There is no evidence from anyone that they heard anything like the sound of working roof either near the seam or from higher.

There is no evidence that there was any sound at all like a roof fall and many say they heard nothing beside a “Pop”.

ERZC Maggs states that the Tailgate was in LEVEL 2 TARP conditions.

***Not necessarily, no. I’d seen it before with cavities and that. And do you know, the thing I wasn’t concerned about at all was, you know, we were still in a level 2 TARP. We had no tip to face. It was only over four to five chocks. We were maintaining it. It was just we wanted to get that – but it just kept coming, the rock just kept coming.***

***You know, we chomped away. It would come in bounds. It would choke off and we’d sort of have to chop that big rock up and sort of get past it.***

**2) WAYNE SELLARS TRANSCRIPT TRA.500.024.0061**

***Q. What was the first notice that you had that something was wrong?***

***A. That first, initial shock, pressure wave that came through.***

***Q. How did you experience that first, initial pressure wave? What did it feel like?***

***A. Standing in a cyclone. A huge - yes, just a huge pressure wave that went through.***

***Q. Prior to the pressure wave itself, do you recall hearing, seeing or feeling anything else unusual?***

***A. Before the first one?***

*Q. Yes.*

***A. Nothing. It took us by surprise.***

1. **ANGLO GROSVENOR MINE LFI METHANE EXPLOSION 6th MAY**

**GIVEN THAT THE LFI and MR MAGGS EVIDENCE IS THAT THERE WAS NO COMPETENT ROOF ABOVE THE CHOCKS DUE TO THE VOID WITH A PRESSURE OF LESS THAN 350 bar, AN INCREASE OF 3% to 9% INDICATES LITTLE TO NOTHING IN THE WAY OF ROOF WEIGHTING**

**The only comment was an about change in leg pressure states at the time of the Explosion on the face there was an increase in the Tailgate Chocks #139 to 149 from less than 350 bar by between 10 and 30 bar.**

**A 10 bar increase is approximately a 3% increase, while a 30 bar increase is a 9% increase.**

**LFI-investigation-report-for-serious-accident-06052020.pdf**

*Figure 8 shows the leg pressure data sourced from Citect on the 6th May 2020, from 14:56:24 to 14:57:47. From the data leading up to the event, it appears that the loading conditions on the roof supports was relatively static, with varying levels of pressures recorded. As the tailgate shields are all reading less than 350 bar, this indicates that there is no competent roof above the shields to set against. This is attributed to carrying the cavity in the tailgate area in the shears prior to the event.*

*At approximately 14:57:25, the leg pressures from roof supports #139 to #149 showed a sudden increase, in the range of 10 to 30 bar,* ***Whilst not a significant pressure, this is indicative of a sudden load being placed on the roof supports, likely attributed to material from the overlying cavity falling onto the roof supports. Again, this supports the investigation team's working theory that the cavity is likely to have propagated to in excess of 5m above the cutting horizon, and that this should be considered further as part of the causation analysis process.***

1. **EXTRACTS FROM INJURED COAL MINE WORKERS RECORD OF INTERVIEW**

**These are extracts from the document 7.-Injured-coal-mine-worker-extracts.pdf available at the Grosvenor Inquiry Website below**

**https://coalminesinquiry.qld.gov.au/wp-content/uploads/2021/04/7.-Injured-coal-mine-worker-extracts.pdf**

1. **MACE KINGSTON**

***Mr Kingston****:* ***The first one was what felt like a reasonably standard goaf fall on a longwall take-off, goafing shears at the start of a new block****. It was a decent enough blast to pop your ears, change the direction of the ventilation for, I would guess, three to five seconds, until it reversed the other way and then there was probably, just at a rough guess, 15-10, 15 seconds until the next one, the big one*

***Mr Kingston: No, I personally didn’t notice any, any type of blast or bang or anything like that****, no recognised heat or anything on either of them*

***Mr Tolhurst: No instant light or anything lit up the…***

*BOI.039.001.0002*

***Mr Kingston****:* ***I didn’t see a flash****. The second blast there was just no visibility at all due to coal dust completely surrounding the area.*

***Mr Tolhurst: Was it any different to other falls or****…*

***Mr Kingston: The first, the first pressure, pressure wave was similar to a large first goafing fall where it popped your ears and changed the direction of ventilation considerably for a few seconds***

***Mr Smyth: Do you have any idea how fast that was moving? I mean I know that’s a detailed question, right, but if there was say dust particles in the air, you know was it going a metre a second or…***

***Mr Kingston: I wouldn’t be able to give it a speed, but it was very similar to our first or a large first goafing fall.***

1. **INJURED COAL MINE WORKER 5**

***Q6: Would you classify the first pressure wind blast event as something that is normal or unusual for longwall operations at Grosvenor mine whilst already having retreated as far away from the installation face?***

***INJURED COAL MINE WORKER 5: I have never experienced a windblast with that amount of pressure in my life before this event. It would therefore be classed as a very unusual occurrence.*** *BOI.039.001.0005*

1. **ADAM MAGGS ERZC**

***MR MAGGS:***  *It had – from the day before, it had come in a little bit from that 149. Like, in line with that 149 to where our cairn line was, it had come in a little bit****. But I think that’s – actually, I know that’s just spoil coming in from your goaf. The roadway wasn’t in. That cavity wasn’t propagating out into any of the roadway. It was good. There was hardly any weight on that around that 149 to roadway.***

***MR MAGGS****:* ***So the arse end of it had some pressure Like I said to you, there wasn’t too much weight around that roadway, the tailgate roadway.*** *It was sitting pretty good. There was some pressure and that, but 144 to 148, we had no pressure.*

***MR STOOK: No pressure?***

***MR MAGGS****: There was nothing above it, you know, that area, the tips and that. We persevered. We sat there. By that stage, Neal, the under-manager, had got down to us as well, and he sat with me all day. We correlated between each other what we were doing. It was just stop/start. It was annoying, in a way, with the belt stoppages and that, because —*

***MR STOOK: When you say that you felt that some of the caving was coming from high, how do you mean? Does it mean that you heard the impact was a lot noisier than normal, or did you hear material detach, a couple of seconds later contact, or —***

***MR MAGGS****:* ***You could hear your rubble and your rocks coming from high****. And the other thing I noticed, when we say – we had no tip to face. This rock was coming straight If you visualise it and that, it wasn’t rolling. It wasn’t rolling off the front of the chocks or anything like It was falling straight.*

***MR STOOK: Yes, yes.***

***MR MAGGS****: And you know yourself, like, you know, if – usually with a cavity, it’ll roll from behind us and that, but it was coming from straight, and the face stood up.*

***MR STOOK: Yes, yes.***

*TRA.510.003.0025*

*MR MAGGS: So it came from there. We pursued and we spoke – me and Nealo kept —*

***MR STOOK: Was it unusual then?***

*MR MAGGS: That it was coming from high and straight down?*

***MR STOOK: Yes, yes.***

***MR MAGGS: Not necessarily, no. I’d seen it before with cavities and that. And do you know, the thing I wasn’t concerned about at all was, you know, we were still in a level 2 TARP****. We had no tip to face. It was only over four to five chocks. We were maintaining it. It was just we wanted to get that – but* ***it just kept coming, the rock just kept coming.***

*You know, we chomped away****. It would come in bounds. It would choke off and we’d sort of have to chop that big rock up and sort of get past it****. We pursued with that for probably two, two and a half hours. That got to around that 12.30 mark and we did another lump breaker shaft, and we didn’t seem to be going too far without that lump*

1. **JACKSON HAYES**

***Mr Tolhurst: What do you recall, what did you hear or feel or see at the time of the incident?***

***Mr Hayes:*** *… So I'd gone up to the maingate, just got up there, got the information,* ***and then there was the first pressure bump. And then we sort of were, like, that's unusual. Everyone's like, you know, sort of like, taking notice****.* ***And then the next wave came over us, all the wind. Myself and Beau were standing next to each other, and I grabbed on to the CME because I was getting blown over.***

***Mr Tolhurst: That was the second one?***

***Mr Hayes: Yes.***

***Mr Tolhurst: So let's talk about the first event.***

***Mr Hayes****: Yes.*

***Mr Tolhurst: How would you describe it?***

***Mr Hayes: A pressure bump, you know, like when you get a goaf fall. Like, most people who've been underground would have felt one at some point.***

***Mr Tolhurst: So you've experienced a goaf fall previously?***

***Mr Hayes****:* ***Yes. Yes, like, yes, I've experienced them, and it's just sort of like your ears equalising through your whole body is the best way I could explain it.***

***Mr Tolhurst: And so the first pressure wave you'd describe as just what you've felt previously, or would it be more?***

***Mr Hayes: It was, yes, just a heavy, like a big, you know, pressure bump. You know, like, it's a weird feeling that you get through your body.***

***Mr Tolhurst: So you felt the pressure?***

***Mr Hayes: Felt the pressure, power was still on, and then –***

***Mr Tolhurst: Did you see anything? Was there a lot of dust or anything around?***

***Mr Hayes: I can't remember seeing anything at that stage. Like, it just sort of had happened, and then the next one came and it was just like a - it just - it felt originally like another one, I think, and then it just built and built, and then the dust came***

1. **INJURED COAL MINE WORKER 1**

***Pages 9-14***

***Mr Dobson: When you say it were a goaf fall, the first one, did you hear that break of strata or…***

***INJURED COAL MINE WORKER 1: Yeah, no…***

***Mr Dobson: …were it just a…***

***BOI.039.001.0011***

***INJURED COAL MINE WORKER 1: …it was just a, yeah just a, the ventilat-, it just pushed us, a big, you know burst of wind going the opposite direction to the ventilation and that stopped the ventilation, it went still.***

***Mr Dobson: You know when, I'm talking from my own experience, you know when you’re at tailgate [unintelligible – “(ui)”] fall, when you’re first goafing…***

***INJURED COAL MINE WORKER 1: Yeah.***

***Mr Dobson: …and you get that break of strata where you’ll hear, it will come down and you’ll hear the strata break behind you. Did you hear any of that or did you just…***

***INJURED COAL MINE WORKER 1: I think no, it was just…***

***Mr Dobson: Just a pressure wave?***

***INJURED COAL MINE WORKER 1: …a pressure wave come through, yes.***

***Mr Dobson: And did you say the first one knocked, it knocked some of the guys over?***

***INJURED COAL MINE WORKER 1: It was, yeah, it was pretty intense the first one and yeah, and that one dropped the power, so yeah and, yeah but that’s, yeah if you haven’t got your feet right and that, especially if you don’t know it’s coming it will knock you over, yeah if you’re not careful.***

***INJURED COAL MINE WORKER 1: The second one?***

***Mr Dobson: Yeah.***

***INJURED COAL MINE WORKER 1: Was yeah, it was just as intense, yes***

***Mr Dobson: Do you recall if you’d had any similar type pressure events, roof falls that…***

***INJURED COAL MINE WORKER 1: No not like that, no.***

***Mr Dobson: No?***

***INJURED COAL MINE WORKER 1: No.***

***Mr Dobson: Some of a lesser magnitude?***

***INJURED COAL MINE WORKER 1: At the start of the wall, yeah, because you always get that period where that roof will (ui) up at the face, it takes a little while, but other than that, before that, prior to that, no I don’t recall any, you know pressure waves or goaf falls like that, yeah.***

***Mr Dobson: Do you recall any on the previous blocks, on…***

***INJURED COAL MINE WORKER 1: Yeah there was a couple on the previous blocks, yeah, nothing like that though, yeah it was just a, the (ui).***

***…***

***INJURED COAL MINE WORKER 1: And it didn’t reverse, the ventilation as, you know, it stalled it for a second, but then it cleared through pretty quick.***

***…***

***Pages 14-15***

***Mr Dobson: …When they, when you had that first pressure wave as well,***

***INJURED COAL MINE WORKER 1: Yes.***

***Mr Dobson: …were there any, did you feel any suck back towards the goaf? Were there any draw back?***

***INJURED COAL MINE WORKER 1: No.***

***Mr Dobson: No. So it were just a pressure wave…***

***INJURED COAL MINE WORKER 1: Yes.***

***Mr Dobson: …a stall of ventilation…***

***BOI.039.001.0014***

***INJURED COAL MINE WORKER 1: Yes.***

1. **INJURED COAL MINE WORKER 3 (131 Chock)**

 ***INJURED COAL MINE WORKER 3: And about then heard a little, like a little pop and he turned to me and said that didn’t sound good and I sort of took it as it’s just, you know the roof was going to fall in again, you know there’s going to be a rock fall and just straight after that the rock fall and that, when it come down, you know just knocked, the air and that forced, knocked us completely over…***

***…But yeah the wind just completely knocked us, you know knocked us all over and then I remember on the, because I was standing on the, the relay bar, me mate was standing on the pontoons, I just remember picking me, looking for me light on the ground and scrambling in the dirt***

***Mr Tolhurst: And how would you describe the intensity of that blast?***

***INJURED COAL MINE WORKER 3: Of the first one, of the air?***

***BOI.039.001.0017***

***Mr Tolhurst: Yeah.***

***INJURED COAL MINE WORKER 3: Yeah just took, yeah just took me by surprise. Yeah I just, next minute, next second I just knew I was on me, on me hands and me knees and me, knees and me hands. I know I hit me, hit me knee on the way down, it was probably on one of the relay bars, but yeah I just, just didn’t know what was happening, it just happened so quick. I'd never been in a big enough fall to, you know to have, knock people over, you know I was just [unintelligible – “(ui)”].***

***Mr Dobson: In your experience before INJURED COAL MINE WORKER 3, have you been on the face when you’ve had goaf falls before where you’ve had a blast of air?***

***INJURED COAL MINE WORKER 3: Nothing like that.***

***Mr Dobson: No. Have you had similar, have you had, have you been on when you’ve set off from the face start line and then you get first goafing? Have you been on the…***

***INJURED COAL MINE WORKER 3: Yes.***

***Mr Dobson:…face when it falls? How did it compare, compare to that?***

***INJURED COAL MINE WORKER 3: Unbelievably, yeah lot, a lot. Yeah I mean I’ve had, you know I’ve had those small falls with the fall and you feel, just feel a gust of wind, you know, just there and back, but this was just, yeah just knocked us completely over and like, and like, and when we heard later it even knocked the blokes in the maingate, then, I mean you don’t realise how big.***

***Mr Dobson: In terms of intensity would it be, you know two or four or six times what you’d normally experience with a normal goaf fall?***

***INJURED COAL MINE WORKER 3: Oh yeah, four or six times, yeah, it was just, yeah it was huge, yeah.***

***Mr Dobson: Okay.***

***INJURED COAL MINE WORKER 3: At least, yeah, it might be more, but yeah I’ve never anything like that. I’ve been, you know a little bit of wind, you feel it and turn, but this was just, yeah completely off me feet and…***

***Mr Dobson: So you talked about a pop sound. Now did the pop occur then, the first pressure wave?***

***INJURED COAL MINE WORKER 3: Yes***

***.***

***Mr Tolhurst: Okay. Almost…***

***INJURED COAL MINE WORKER 3: Most, straight after, yeah heard the pop and then simultaneously it was like, yeah it was like then, I heard the pop and then just the fall, we heard the fall and just the wind, yeah.***

***Mr Dobson: So what would you say like, like when it sounds like a strata layer breaking, is that similar to like when you’ve advanced a shield and you hear that crack of ground that drops behind you? Like if you get tailgate shields and then it’s been hanging up.***

***INJURED COAL MINE WORKER 3: I’ve never sort of really heard that sound (?) that clear like a pop before, so it was different, yes. Yeah, yeah it was definitely, yeah that’s, I mean it was, yeah just, and that’s why I went, we, and like I said I was talking to INJURED COAL MINE WORKER 1 and it, yeah it definitely, you know it sounded different, you know, it was, yeah like, so that’s why it sounded like it was going to be bad, you know because I never heard that and it was like a pop and then yeah.***

***…***

***Mr Dobson: And you said the lights went out. Did they go out on that first pressure wave?***

***INJURED COAL MINE WORKER 3: Yeah, that’s what, yeah.***

***Mr Dobson: Okay. When you, I know I'm labouring down on this crack sound, this pop sound, but what sort of loudness would you put with that pop?***

***INJURED COAL MINE WORKER 3: It wasn’t really loud, it was like just something you could just virtually hear, but it was, yeah definitely like a popping sound, it wasn’t, you know like, like a, yeah probably different, like cracking was just a pop.***

***Mr Dobson: And the pressure wave came more or less simultaneously after it did you say?***

***INJURED COAL MINE WORKER 3: Yes, yeah.***

***Mr Tolhurst: And then that’s knocked you to the ground.***

***INJURED COAL MINE WORKER 3: Yep.***

***Mr Tolhurst: Had you gotten up prior to the second event?***

***INJURED COAL MINE WORKER 3: I'm not sure if I was trying to get up. I think I, I think I might have, but yeah I must have, must have just got up, because I think I was standing up***

***BOI.039.001.0019***

***when I got, yeah, so I must have just got up and then, and virtually I know, I know, I can't even remember if I actually saw it coming towards us, but yeah then it, yeah I think I must have just got up and then yeah, because we were standing up when we were on the fire, on fire.***

***Mr Dobson: And with regards to the pressure waves, did you feel any suck back between the pressure waves at all? Do you recall any...***

***INJURED COAL MINE WORKER 3: No I didn’t notice any.***

***Mr Dobson: No.***

***INJURED COAL MINE WORKER 3: No, I didn’t notice it.***

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***Mr Dobson: With the pressure wave, INJURED COAL MINE WORKER 3, do you recall whether it changed the visibility? Were there dust blown up, were there anything different in the environment with the pressure wave, with the first one?***

***INJURED COAL MINE WORKER 3: There’s a lot of dust in the air, once we’re getting up, yeah could hardly see. I mean obviously it was dark as well, but yeah you could tell there was a lot of dust, there was a lot of dust in the air.***

***Mr Dobson: Yeah and when you say knocked you over, so it came from the goaf to the face, the direction of the wave?***

***INJURED COAL MINE WORKER 3: Probably more from the tailgate, the tailgate than the, yeah than directly from the goaf.***

***Mr Dobson: Okay.***

1. **INJURED COAL MINE WORKER 2 (132 Chock)**

***And I remember it was just pretty casual. I think we were just, I was sitting there talking and that with Jackson I think or INJURED COAL MINE WORKER 3, one of them two, I can’t remember. I don’t actually remember walking into the tailgate, but I have had flash, flashbacks of me doing it and, but I do remember ventilation change, like a, the ear pressure and I remember hearing….A…couple of months ago I…got woken up by the sprinklers outside, the garden sprinklers starting and that reminded me of the noise, so that’s, I kind of heard that kind of noise, like sprinklers. Obviously it wasn’t sprinklers, but yeah…***

***…and then I just remember being on fire and the fire going out and I sort of fell down unconscious obviously…then I remember waking up and…just walking out of there.***

***…***

***Mr Tolhurst: So when the incidents occurred have you felt, you mentioned the sprinklers and the change in the ventilation…did you feel anything else?***

***INJURED COAL MINE WORKER 2: I did hear a goaf fall to be honest, yeah I did, yeah…***

***Mr Tolhurst: And can you explain what that sounded like?***

***INJURED COAL MINE WORKER 2: It’s like, yeah like a, the roof, like the roof falling down, you know like a, it wasn’t, it wasn’t huge, but it was bigger than just a little one, you know…***

***Mr Tolhurst: So in your experience working longwalls since 2011, have you experienced goaf falls?***

***INJURED COAL MINE WORKER 2: Oh yeah, yeah.***

***Mr Tolhurst: So how would you rate this goaf fall?***

***INJURED COAL MINE WORKER 2: Oh, it was, when it happened I didn’t really think anything of it because, yeah, I remember it happening and then I didn’t think anything of it, I just thought, oh, yeah it was a bit of a, yeah, a bit of a fall. But, you know.***

***Mr Tolhurst: Okay, and the location of the fall?***

***…***

***Mr Tolhurst: You know behind the chocks or…***

***INJURED COAL MINE WORKER 2: Yeah, yeah, it would have been in the main, in the tailgate roadway or…behind the tailgate chocks, yeah I’d say.***

***Mr Tolhurst: So it was towards the tailgate end?***

***INJURED COAL MINE WORKER 2: Yeah, yeah, it was more inbye than what I, where I was.***

***Mr Tolhurst: And with hearing that goaf fall, did you hear or feel anything else at that time?***

***INJURED COAL MINE WORKER 2: After it I’m pretty sure I heard those sprinkler kind of, yeah like a, I don’t know if it was a, yeah, I can’t, that’s the only way I can explain that noise, yeah.***

***Mr Tolhurst: Okay and the change of ventilation, apart from the noise can you recall…***

***BOI.039.001.0022***

***INJURED COAL MINE WORKER 2: Just the pressure in my ears. I remember it being quite, quite large, yeah…***

***And I can’t say when that happened, but I know, like I’ve had a flashback and I can remember, you know, I can actually remember that change of pressure, yeah. And it wasn’t normal for where we were and what we were doing.***

***Mr Tolhurst: And with regards to the change in pressure, did you only feel it once or…***

***INJURED COAL MINE WORKER 2: Yeah, just once.***

***Mr Dobson: Do you recall INJURED COAL MINE WORKER 2, when that pressure change occurred, do you recall whether the ventilation changed at all?***

***INJURED COAL MINE WORKER 2: Yeah.***

***Mr Dobson: The air velocity.***

***INJURED COAL MINE WORKER 2: I think so, yeah, like of course it did, you know it was quite large, yeah, yeah.***

***Mr Dobson: You don’t recall how long that was for?***

***INJURED COAL MINE WORKER 2: No, I’m a bit lost with the…I can remember certain bits, but I can’t remember…in what order, you know.***

***Mr Tolhurst: And with regards to I guess the goaf fall and the change of ventilation or pressure, did that, were you affected by that?***

***INJURED COAL MINE WORKER 2: No it didn’t knock me over, not from what I can remember, no.***

***…***

***I don’t even remember like a, like a push or anything like that. I don’t, I remember just being on fire. I’m not sure if, if there was a push when that happened or not, but yeah***

***BOI.039.001.0024***

1. **BEAU LACEY (Maingate)**

***Post-incident statement to Anglo***

***“Sitting at MG, felt ears funny. Vent reverse and went then sucked in, another pressure wave.”***

1. **THOMAS BARRY (Maingate Carport Area)**

***Post-incident statement to Anglo***

***“2 x vent reversed. Dust. 2nd larger than first”***

1. **JOHN BADKE (Maingate DCB)**

***Post-incident statement to Anglo***

***“I was located at MG DCB platform. Last DAC call I heard was double chocking at TG. Severe wind blast experienced at MG roadway. Loss of power and methane warning heard over DAC”***

1. **AARON CHRISTENSEN (5 shield)**

***Post-incident statement to Anglo***

***“Small bump. Felt big bump. Dusted out.”***

1. **JASON DITCHBURN (6 C/T)**

***Post-incident statement to Anglo***

***“2 x pressure waves. Ears popped. Power went out after 2nd pressure wave.”***

1. **MY EXPERIENCE GOONYELLA MIDDLE SEAM MINE ROOF FALLS**

**I was an Industry Safety and Health Representative for 7 years between 1999 and 2006.**

**I attended the North Goonyella Mine, Moranbah North Mine and the Broadmeadow Mines on numerous occasions over that time due to major roof falls in both Longwall and Development.**

**These falls were often the cause for me to attend within hours via cancelling planned Inspections at other Mines that day.**

**I would Inspect the Mine and in particular the area of the fall and Examine the applicable Elements in the company of the Site Safety and Health Representative and in 90% of cases the Underground Mine Manager.**

**In all of that time, as well as normal longwall operations, I have never seen roof conditions at all conducive to mass fall events, except in development. This occurred when sufficient secondary roof support (cable bolts, mega bolts) had not been installed as part of normal development roof support.**

**The Installation of standard-length roof bolts of 8 feet (2.4m) in length, is not generally capable of forming a stable roof in this seam. The condition tends to become worse as depth of cover increases.**

**The roof fails above the “Beam” formed by the 8 foot bolts.**

**In Development I have seen major falls running up to 300m in length both at North Goonyella and the first set of Gateroads at what became Broadmeadows. (The Mine was then called the Goonyella Exploration Adit Project or “GEAP” for short)**

**NORTH GOONYELLA**

**INSPECTION OF NORTH GOONYELLA COAL MINE HELD ON THURSDAY, 11TH NOVEMBER 1999 Attachment 1**

**Today in company of Adam James (Local Miners’ Officer) and Gary James (Mine Deputy), an inspection was made of 1N Maingate “D” Heading 15 C/T inbye.**

**This inspection was initially requested in response to concerns about general safety of men engaged in erection of secondary support in area of 15 to 16 C/T.**

**Also due to rising CO levels behind 17 C/T seal, an inspection was carried out in this area and into 23 C/T.**

***15- 16 C/T. Serious roof deformation has occurred with guttering down the rib lines and roof sag. The high 10 bolts have pulled through the plates in a number of spots. Additional support in the way of pigsties and cans has been erected in this area. The ribs show signs of bagging out.***

***ACTIONS***

1. ***Another Tomlinson Boiler is to arrive on site at approximately 5p.m. and preparations are being made for it to be connected to the 18 C/T seal for injection of boiler gas. Plans to connect the borehole to the seal by 6 inch flexible hose are being organised.***

***Prior to this occurring I require:***

 ***a) Communications be set up from a point outbye the failing roof 15***

 ***16 C/T to 18 C/T.***

***b) Minimum number of people be used to carry up the hose and***

***connecting pipes.***

***c) All men engaged in this task to carry additional SSR90 breathing apparatus.***

***d) A suitably qualified cockatoo to remain on station at the 15 C/T communication site to monitor the roof and be able to contact the men inbye.***

***2. WORK ON 15 16 C/T***

 ***Prior to work continuing inbye of erected supports I require:***

 ***a) A deputy be on station to monitor roof, rib and gas conditions while***

 ***men are working in this area.***

 ***b) Additional rib support be installed in areas where men are required***

 ***to travel and carry supplies to the secondary support area, and pass***

 ***between erected supports and the baggy rib.***

 ***c) Men engaged in this activity to have SSR 90’s readily available.***

**GEAP**

**INSPECTION DATE: Wednesday, 3rd May 2000 Attachment 2**

**Today in the company of Frank Fulham an inspection of the G.E.A.P underground mine was undertaken.**

***This fall extends roughly from 23—25 CIT, and reaches heights of over 10 meters above the normal roof horizon in areas. There are quite pronounced joint planes and fault structures running virtually parallel to the direction of mains driveage, no doubt being the sources of this large failure.***

***The presence of this cleat induced rib instability is indicative of what appears to be disregard for the effect of cleat direction, and also the jointing and fault directions on mining conditions during the planning stages of this mine.***

***I fail to understand why the direction of development was not offset to minimise these geological effects. My understanding of the initial plans for possible longwall extraction in this area was for the wall to be extracted up dip towards the pit top.***

***The current situation will probably ensure good face conditions on the longwall itself but will almost certainly mean poor gateroad stability, if the state of 'A' HDG fall is any guide.***

***Indeed it would also indicate that any plans to retreat a longwall up the 'A' HDG side of the mine in areas affected by faulting would be fraught with danger if not impossible.***

**LONGWALL ROOF STABILTY**

**My experience is that I have never seen of heard of a situation in the Goonyella Middle Seam as hypothesized of a massive roof fall high in the Goaf.**

**The situation every time I have observed, is in fact the exact opposite.**

**I have seen this on Goonyella Longwalls in normal Operation, and on every occasion when suffering from higher roof instability.**

**This applied at North Goonyella Mine on every occasion I observed the Longwall.**

**It is like Adam Maggs the ERZC on the Longwall 104 Face at Grosvenor described.**

**The material coming from high up varies all the way from coarse Sand type material, pebbles and smaller rocks say size of human torso and then goes to rocks the size of roughly a VW Combi Van.**

**That is how they big rocks picked up the nicknames of “V Dubs” or “Combi’s”.**

**When the V Dubs start falling from height you can hear them coming down quite distinctly as they bang their way down to the seam level and onto the chocks and face.**

**MORANBAH NORTH**

**This applied at Moranbah North Longwall.**

**In my Mine Record Entry for the Inspection for the 24th January 2004. Attachment 3**

***The Mine has been experiencing poor roof conditions in the tailgate roads in LW105. A number of roof falls had occurred which led eventually to the loss of effective ventilation across the longwall face by the 14th of January. It is estimated there could be up to 180m of fallen roadway.***

**The main reason for the fall was the fact that the primary roof support was not sufficient for the Tailgate Roadway to stand under the stress from forward abutment pressure.**

**The only way the roof could be made to stand was the installation of passive secondary supports, and also by injected consolidation of the longwall block rib in the Tailgate Roadway.**

**The reason the rib was consolidated was to try and prevent excessive rib spall.**

**If the rib spalled too far and the effective width of the roadway extended, then the beam failed and the roof fell.**

**From memory it was a stated Requirement under the SOP’s for the support work to be at least 100 metres in front of the Longwall Face. If not, the Longwall was to stop cutting until the support was at least 100m in front of the Longwall face.**

**Again, from memory, the requirement for the passive support and injected rib consolidation was not followed.**

**This was at the express order of the Longwall Co-ordinator, who did not want to stop production to get the support installed as per the written SOP’s.**

**There was no risk assessment conducted as required by the Act and Regulations.**

**The Longwall Coordinator who made this illegal solo decision shortly thereafter decided to further his career at another Underground Mine and Company.**

**This was after previously at Oaky No 1 Mine making a similar non risk assessed Unilateral decision while Longwall Coordinator; to drastically lower the Installed roof support in the relief road at the Installation face for the next longwall block.**

**The roof in the completed Relief Road started working and contract workers installing cable bolts were not aware. They had to be quickly, forcibly evacuated by one of the full-time workers who was in an outbye area of the relief road when it started to fret and work.**

**The full time Oaky No 1 worker was a very experienced Underground Miner I had worked at the same mine with for a number of years. He was also later elected to be one of the Site Safety and Health Representative at Oaky No 1.**

**The Longwall Coordinator left Oaky No 1 very shortly after to further his career at another Mine and Company. That is how he ended up at Moranbah North,**